MEMORANDUM

DATE	May 22, 2014
TO	City of Milpitas
CONTACT	Felix Reliford, Principal Housing Planner
FROM	Dr. Cathleen Fitzgerald, P.E.
RE	**Revisions to Safety Element as per AB 162**
PROJECT NO.	BAE-03

Dear Mr. Reliford:

Attached please find our revised section of the Safety Element of the General Plan as per comments received from the City. As per AB 162 requirements, this revised Safety Element to includes updated flooding information and establish comprehensive goals, policies, and objectives to protect the community from the risk of flooding. Once you have had a chance to review this revised document and provide comments, we can incorporate it using whatever format you would like into the existing Seismic and Safety Element. Also, we have added a small addition to the Open Space and Environmental Conservation Element to include a map of rivers, creeks, streams, and riparian habitat as per AB 162. We also have included a Response to Comments section that follows to address each comment from the City.

Respectfully submitted,
PLACEWORKS

Cathleen M. Fitzgerald, P.E.
Senior Engineer

RESPONSE TO COMMENTS

Page 2, First Paragraph – The requested references for AB162 and the Santa Clara County *Local Hazard Mitigation Plan* have been provided and are attached to this transmittal.

Page 2, 3rd Paragraph – A figure showing the location of the streams has been added.

Page 2, 4th Paragraph – The requested reference regarding the Flood Control Assessment District has been provided and is attached to this submittal. A reference has been added that shows the source of information in the text.

Page 3, 2nd Paragraph – The references to a flood in 2014 have been deleted.

Page 3, Bullet items following 2nd Paragraph – Figures showing the flooding mechanism for each bullet item are beyond the scope of a Safety Element in a General Plan and would be difficult to convey graphically. The description of the flooding mechanism is contained in each bullet item. This information was taken from the City of Milpitas Storm Drain Master Plan and the Milpitas Midtown Specific Plan. There are no dates associated with the described potential for flooding along each creek. If the City can provide dates, these will be added to the Safety Element.

Page 3, 3rd Bullet Item – The typo has been corrected.

Page 3, 4th Bullet Item – A reference to the Berryessa Creek improvements has been added. It is discussed in further detail under Flood Control Projects.

Page 3, Bottom of Page – The source for this information is the Milpitas Storm Drain Master Plan, as referenced at the end of the bullet items on page 4. However, this reference has been moved to the beginning of the bullet items to make it more visible.

Page 4, 2nd Paragraph – Typo has been corrected.

Page 4, 3rd Paragraph – The figure number has been added.

Page 5, 1st Paragraph – The extent of Reach 4 has been defined.

Page 5, 2nd Paragraph – The reference regarding improvements along Tularcitos Creek does not specify the amount of freeboard that will be implemented. Alternatives include floodwalls that range from one foot to over 5 feet; the actual design has not yet been determined.

Page 5, 3rd Paragraph – It would be difficult to include a figure that shows where the work was completed in Sierra Creek, Los Coches Creek, and Calera Creek, since sediment removal occurs at various locations along the reaches of these rivers. Also, this level of detail is beyond the scope of a Safety Element in a General Plan.

Page 5, 4th Paragraph – The statement that storm drain inadequacies occasionally are due to flat or adverse street grades comes from the City of Milpitas *Storm Drain Master Plan.* The locations where this occurs are not provided in the referenced document.

Page 5, Table 1 – These goals and policies are taken directly from the Milpitas General Plan and are reiterated in pages 5-14 and 5-15 of the Safety Element. Therefore, this table has been deleted. The question if these implementation measures have been verified is not something that can be determined by PlaceWorks; this is

a subject that should be discussed among City personnel. However, these implementation measures are provided on pages 5-14 and 5-15 of the previous Safety Element.

Page 6, 2nd Paragraph – The typo has been corrected. The statement that in Zone AO, the lowest floor must be three feet above the highest adjacent grade if no depth number is shown is in the Municipal Code (XI-15-5.1.c.1.i Standards of Construction).

Page 7, 3rd Paragraph under Dam Inundation – The figure number has been added.

Page 8, 2nd Paragraph – Additional language has been added to define dam failures under fair weather conditions.

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Page 8 – Open Space and Environmental Conservation Element – The text in these two paragraphs is repetitious because AB162 requires a map of creeks and rivers to be included in this element when revising the Housing Element. Therefore, a bit of background has been added to set the context for the figure. The section number has been changed to Section 4.9 so it can go at the end of the Open Space and Env. Conservation Element and then the figure numbers were be in sequence. Figure 4-7 is now referenced.

PLACEWORKS

SEISMIC AND SAFETY ELEMENT

5.2 DRAINAGE, FLOODING, AND DAM INUNDATION

This Safety Element update includes required information related to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs), dam inundation zones, and City goals and policies to comply with State law (specifically AB 162 and California Government Code 65302). This Safety Element also includes the adoption of the Santa Clara County's multi-jurisdictional *Local Hazard Mitigation Plan* and the City of Milpitas' *Local Hazard Mitigation Plan Annex* to ensure that appropriate emergency measures are implemented when natural disasters occur.

DRAINAGE

The City lies at the base of the Diablo Range extending from the foothills to an alluvial plain of the Santa Clara Valley. The City is divided nearly in half between the eastern hillside area and the western low-lying plain. However, the hillside area is primarily undeveloped and designated as open space. Elevations range from sea level near Coyote Creek to approximately 2,400 feet above mean sea level (msl) near Monument Peak in the northeastern portion of the City.

Drainage within the City is primarily from the southeast to the northwest. Several intermittent streams/creeks flow out of the foothills and through Milpitas before eventually discharging into Coyote Creek, which is a perennial stream that borders the City of Milpitas to the west. Coyote Creek eventually becomes a tidal slough and discharges into San Francisco Bay. These intermittent streams are identified as:

- Calera Creek
- Tularcitos Creek
- Los Coches Creek
- Piedmont Creek
- Berryessa Creek
- Wrigley-Ford Creek
- Lower Penitencia Creek

Figure 5-3 shows the locations of all of the creeks within the City of Milpitas. ~~All of these~~The intermittent creeks have been channelized along portions of their stream courses for flood control purposes. The City is located within the East Zone of the Flood Control Benefit Assessment District. The Santa Clara Valley Water District (SCVWD) is responsible for maintenance and measures for flood protection within the Assessment District. This is discussed in further detail in the annual reports provided by SCVWD entitled *Flood Control Benefit Assessments* (2013).

The City also maintains a storm drainage network consisting of street gutters, catch basins, conveyance piping, pump stations, and outfalls to creeks. The City has approximately 123 miles of storm drain piping, 3,000 catch basins, 4 miles of drainage ditches and creeks, and pump stations in low-lying areas. Storm water runoff typically is collected in a system of underground pipes and network of street gutters. Local runoff flows into the creeks and channels that run through the City, eventually discharging to San Francisco Bay. Storm drain systems close to the Bay tend to rely heavily on pumping facilities to convey the water.

FLOODING

Flooding typically occurs within the City due to two interrelated factors: 1) the overflow of major creeks and channels due to limited capacity in relation to flood flows; and 2) inadequate capacity of local drainage facilities. The SCVWD manages the major creeks and channels that flow through the City, while the City of Milpitas maintains the storm drain system and is responsible for managing flow in Wrigley-Ford Creek.

Historical flooding has occurred in 1978, 1980, 1982, 1983, 1986, 1995, and 1998~~, and 2014~~. In February 1998, localized flooding occurred in the areas of Hillview Drive, S. Milpitas Boulevard at Montague Expressway, and Gladding Court. ~~A storm in March 2014 resulted in power outages and localized flooding in Milpitas, including Dixon Landing Park and Montague Expressway.~~ Additional areas subject to historical flooding, as discussed in further detail in the City of Milpitas *2013 Storm Drain Master Plan,* include:

- Calera Creek – Storm runoff spills over the south bank upstream of North Park Victoria Road and Interstate 680, flooding the adjacent Higuera Adobe Park. Spills from the south bank downstream of Escuela Parkway flow toward Berryessa Creek, where levees trap the water at Hidden Lake and the Berryessa Pump Staiton. Flood waters that cannot be pumped into Berryessa Creek form a residual floodplain.

- Los Coches Creek – Upstream of Interstate 680, the channel does not have sufficient capacity to carry the 100-year discharge. Inadequate channel capacity at Old Piedmont Road causes floodwaters to spill to the south. Additional flows leave the channel upstream of I-680, eventually reaching the highway where they pond.

- Lower Penitencia Creek – The SCVWD has lined this creek with concrete and built floodwalls to protect adjacent properties throughout the City of Milpitas. Lower Penitencia Creek overflows to the west from just south of Elmwood Jail north to the Coyote Creek confluence. However, Highway 880 contains this spill. The east bank levee of Lower Penitencia Creek is fully accredited for published base flood discharges between the confluence with Berryessa Creek and Coyote Creek. Nuisance flooding and 10-year storm event ponding to the top of the curb occur along Abel Street north of Calaveras Boulevard.

- Berryessa Creek – This creek floods, on average, once every four years. The storm event in 1998 caused significant damage to homes and automobiles. A 100-year flood associated with this creek is expected to impact development in the area bounded by Lower Penitencia Creek to the west, Calaveras Boulevard to the north, and Montague Expressway to the south. The low area on Watson Court is particularly susceptible to flooding. A flood control project to reduce the potential for flooding along Berryessa Creek is discussed in further detail in the following Flood Control Projects section.

- Wrigley Creek – This creek overtops its banks at Montague Expressway because of an undersized culvert. Wrigley Creek has insufficient capacity to carry the 100-year flood event west of the Great Mall and runoff would spill into the Great Mall parking lot.

- Ford Creek – This creek would overtop its banks in the 100-year storm event and spill toward Lower Penitencia Creek before it is blocked by floodwalls. The inundation would cover the area west of

Railroad Avenue north of Carlo Street and along North Abel Street. Localized flooding from a 100-year storm event would also affect Sinnott Lane. In Railroad Avenue, an undersized culvert would cause the creek to overtop its banks in the 100-year storm.

- Coyote Creek – In the past, flooding along Coyote Creek has been frequent with 12 major floods between 1903 and 1941. With the construction of Coyote and Anderson Reservoirs, the frequency of flooding has been reduced, but inadequate channel capacities along some portions of Coyote Creek have resulted in continued flood damage. Storms in January 1997 generated record runoff in Coyote Creek and the creek overtopped its banks at several locations but the area downstream of Montague Expressway was well protected by levee improvement projects. The area west of I-880 has been removed from the 100-year floodplain designation and is now mapped as Zone X.

~~Additional information on historical flooding is provided in the City of Milpitas 2013 *Storm Drain Master Plan.*~~

The City is a participant in the National Flood Insurance Program (NFIP). The NFIP provides property owners and renters with federally backed flood insurance, reduces flood damage through a mandatory local floodplain management ordinance, and identifies and maps flood hazards. The NFIP requires the City to maintain a floodplain management ordinance based upon current FEMA Flood Insurance Rate Maps (FIRMs). The City~~'s~~ meets this requirement through the implementation of *Floodplain Management Regulations* specified in Section XI of the Milpitas Municipal Code. These maps identify Special Flood Hazard Areas (SFHAs) or areas subject to inundation from a 100-year storm.

Approximately 50% of the City is within the 100-year floodplain, as determined by the latest FEMA FIRM maps and as shown in Figure ~~XX~~5-4. The areas within the City include the following FIRM map designations:

- Zone A – Areas subject to inundation by the 1% annual (~~100-~~100-year) flood event. Because no detailed hydraulic analyses have been performed, no Base Flood Elevations (BFEs) or flood depths are shown.
- Zone AE – Areas subject to inundation by the 1% annual (~~100-~~100-year) flood event. BFEs are shown within these zones.
- Zone AH – Areas subject to inundation by a 1% chance of shallow flooding (usually areas of ponding) with average depths ranging from one to three feet. BFEs derived from detailed hydraulic analyses are shown in this zone.
- Zone AO – Areas subject to inundation by a 1% chance of shallow flooding (usually sheet flow) with average depths ranging from one to three feet. Average flood depths derived from detailed hydraulic analyses are shown within this zone.

FLOOD CONTROL PROJECTS

Flood control projects have recently been implemented or are scheduled for future implementation to reduce the impacts of flooding within City limits. The City of Milpitas is responsible for improvements to the storm drain system, as described in the *Storm Drain Master Plan* (July 2013). The SCVWD is responsible for improvements to the creeks and channels within the City, with the exception of Wrigley-Ford Creek, which is under the jurisdiction of the City.

Two large flood protection projects are scheduled by the SCVWD for Coyote/Berryessa Creek and Upper Penitencia Creek. The goal of the Coyote Creek Flood Protection Project is to provide protection to the surrounding area from the 100-year flood. The schedule is to start construction of the improvements for Reach 4, which ~~is south of~~extends from Montague Expressway to Charcot Avenue, between 2014 and 2016.

Berryessa Creek floods on average once every four years. The proposed SCVWD project would include setback levees, floodwalls, sediment control structures, and environmental restoration. This project will also include improvements to Calera Creek (reconfigure the channel and provide concrete floodwalls to contain peak flows) and Tularcitos Creek (construct a storm water pump station near the confluence of Berryessa Creek and construct short concrete floodwalls upstream of the pump station to provide adequate freeboard). These improvements to Berryessa Creek are slated for completion in 2017 contingent on continued funding.

In addition, the SCVWD completed work in Sierra Creek, Los Coches Creek, and Calera Creek in 2010. The activities included bank protection and sediment removal in Sierra Creek, and sediment removal in both Los Coches Creek and Calera Creek.

The 2013 *Storm Drain Master Plan* proposed a Capital Improvement Program to address storm drain inadequacies within the City. Storm drain inadequacies are primarily caused by undersized pipe or occasionally due to flat or adverse street grades. The areas designated as high priority for storm drain improvements, replacement, or relief drains include the following:

- Tularcitos Creek at Berryessa Confluence (BT1) – Traughber Street, Wool Drive, Park View Drive
- Coyote Creek at Oak Creek Pump Station (C1) – Sycamore Drive
- Los Coches Creek East of 680 (L2) – Dempsey Road and Edsel Drive
- Penitencia Creek at Manor Pump Station (P4) – Silvera Street
- Penitencia Creek at Berryessa Confluence (PB1) – Redwood Avenue, Abbott Avenue, Maple Aveune, Chestnut Avenue, Heath Street, North Abel Street, Vasona Street, Lexington Street, Coyote Street
- Piedmont Creek at Berryessa Confluence (PDB1) – Wrigley Way
- Tularcitos Creek East of 680 (T1) – Jacklin Road
- Wrigley/Tularcitos/Calera Creek at Jacklin Road (WTCA1) – N. Hillview Drive

FLOOD GOALS, POLICIES, AND IMPLEMENTATION MEASURES

~~This section profiles T~~the goals, principles, and implementation measures adopted by the City to limit the negative impacts of flooding and demonstrate compliance with all applicable Federal and State regulations. These goals, principles, and implementation measures are ~~summarized in Table 1.~~provided in Section 5.5 of the Safety Element – *Seismic/Safety Principles and Policies*.

~~Table 1 City of Milpitas Goals and Policies~~

~~Goal~~	~~Guiding Principle~~	~~Implementation Measure~~
~~Flood Protection~~	~~Minimize threat to life and property from flooding and dam inundation (5.b-G-1).~~	~~Ensure that new construction or substantial improvements to any existing structure result in adequate protection from hazards. This includes ensuring that new residential development within the 100-year flood~~

Table 1 City of Milpitas Goals and Policies

Goal	Guiding Principle	Implementation Measure
		zone locates the lowest floor, including basement, above the base flood elevation; and new non-residential development locate the lowest floor, including basement, above the base flood elevation or incorporate flood-proofing and structural requirements as spelled out in the Municipal Code (5.b-I-1).
		Require that all structures located within the 100-year flood zone to provide proof of flood insurance at the time of sale or transfer of title (5.b-I-2).
		Ensure that encroachment into designated floodways does not result in any increase in flooding hazards (5.b-I-3).
		Continue working with the Office of Emergency Services to update and maintain the Sandy Wool Lake Dam failure evacuation plan (5.b-I-4).
		Seek construction of flood control channels to withstand 100-year floods along Coyote, Penitencia, Berryessa, Scot, Calera, and Los Coches Creeks (5.1-I-5).
Water Quality Protection	Protect and enhance the quality of water resources in the City (4.d-G-1).	Continue implementing the National Pollutant Discharge Elimination System (NPDES) requirements of the Regional Water Quality Control Board, as specified in Chapter 16 of the City's Zoning Ordinance (4.d-I-1).
	Promote conservation and efficiency in the use of water.	Continue implementing the use of water efficient landscapes and water conservation measures, as specified in Chapters VIII-5 and VIII-6 of the City's Municipal Code (4.d-I-2).

In addition, the City of Milpitas has implemented provisions as specified in Section XI-15 *Floodplain Management Regulations* of the Municipal Code. These provisions require the developer to submit a permit application showing the development plans, in particular the measures that will be taken to prevent flood hazards or elevate buildings out of the floodplain.

All new residential construction must have the lowest floor built to at least one foot ~~about~~ above the Base Flood Elevation (BFE), or in the case of areas within Zone AO, at least one foot about the depth number listed on the Flood Insurance Rate Map (FIRM), or three feet above the highest adjacent grade if no depth number is shown. For non-residential construction, the lowest floor elevation can be at BFE but the structure needs to be floodproofed and designed for buoyancy.

All new construction (residential and non-residential) with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Within Zone AH or AO, improvements shall be constructed so that there are adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures. Further details of these provisions can be found in the following sections of the City of Milpitas Municipal Code:

- Standards of Construction (Section XI-15-5.1) – Specify requirements for anchoring, construction materials and methods, and elevation and floodproofing
- Standards for Utilities (Section XI-15-5.2) – Specify requirements for new and replacement water supply and sanitary sewage systems, and on-site waste disposal systems
- Standards for Subdivisions (Section XI-15-5.3) – Specify the elevation of the proposed structure(s) and pad(s) and provide adequate drainage to reduce exposure to flood hazards
- Floodways (Section XI-15-5.6) – Specify requirements and constraints for encroachments and other flood hazard reduction provisions.

Any permit application for new construction within a FEMA-designated 100-year flood hazard will be reviewed by the City Manager, who is appointed as the Floodplain Administrator to enforce Section XI-15 of the Milpitas Municipal Code. The administrator will determine if all requirements specified in Section XI-15 have been satisfied and either grant or deny the permit.

In addition, while regional flooding mitigation will be handled by the SCVWD and the US Army Corps of Engineers for creek improvements, localized flooding mitigation will be handled by the City with storm drain improvements or individual developers in accordance with a developer-funded and City-approved Storm Drainage Plan.

DAM INUNDATION

Dam failure is the uncontrolled release of impounded water from behind a dam. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, or sabotage can all cause a dam to fail. Dam failure can result in downstream flooding that can affect property and life. However, there is no historical record of dam failure in Santa Clara County or the City of Milpitas. In addition, there is minimal risk in the Bay Area for dam failure due to safety protocols established by the State Division of Safety of Dams, according to Appendix C *Natural Hazard Risk Assessment* of the ABAG *Regional Hazard Mitigation Plan* (2010).

In the unlikely event of a dam failure, inundation maps have been developed by The Association of Bay Area Governments (ABAG) and SCVWD to aid in evacuation planning. Three dams have inundation zones within the City of Milpitas:

- Anderson Dam
- Coyote Dam
- Sandy Wool Lake Dam

A dam inundation map is provided as Figure XX, and additional information regarding the dams is provided in the following paragraphs.

Anderson Dam and Coyote Dam operate in tandem with controlled releases to minimize the potential for downstream flooding along Coyote Creek. Coyote Dam is an earth and rock dam built in 1936 by SCVWD for water supply. Anderson Dam was built in 1950 by SCVWD for water supply and also is constructed of earth and rock. In 2011, a seismic study of Anderson Dam indicated that the foundation and base of the dam could weaken due to liquefaction from a 7.25 magnitude earthquake along the Calaveras Fault, which is located about 2 kilometers from the dam. As a result, the Division of Safety of Dam (DSOD) has established operating restrictions, reducing the amount of allowable storage to 68% of capacity. The dam is scheduled for seismic retrofit and the reservoir will be drained in 2015; completion of the retrofit is scheduled for 2018.

The latest dam inundation maps prepared by SCVWD in 2009 indicate that the arrival time of a flood wave into the City of Milpitas would be about 5 hours, 15 minutes for the inflow design flood (IDF) and 6 hours, 48 minutes for the fair weather flood. The inundation zone is confined to an area west of I-880 with a maximum elevation of 32 feet msl for the fair weather flood, which is defined as non-storm conditions at full capacity. A fair weather flood can occur under sunny (non-precipitation conditions) due to piping/internal erosion failure for an embankment dam or due to a monolith collapse resulting from sliding, foundation instabilities or a seismic event for a concrete dam. The inundation zone extends to I-680 north of Calaveras Boulevard with a maximum elevation of 35 feet for the IDF, which is defined as a dam failure occurring during a large storm event at maximum capacity. Since the dam is currently operating at 68% of capacity, these dam inundation zones are conservative and overestimate the flooding impact in the unlikely event that a dam failure occurs. The delayed arrival time of a flood wave would allow sufficient time for evacuation of City residents, if needed.

Coyote Dam is located upstream of Anderson Dam and has a dam inundation zone that includes the western edge of Milpitas in the area approximately 1,200 to 2,200 feet west of I-880. The arrival time of the flood wave for this dam is about 6 hours and 30 minutes, which is sufficient time for evacuation of City residents, if needed. Operating restrictions have also been implemented for this dam with a maximum allowable storage of 53% of its capacity, due to the presence of the Calaveras Fault under the dam. As a result, the dam inundation zone is much smaller than the mapped area.

The third dam with a dam inundation zone within the City is Sandy Wool Lake Dam, which is located in Ed Levine Park. According to the Office of emergency Services for Santa Clara County, parts of the City along the Calaveras Road area east of I-680 could be inundated by failure of this dam. The anticipated arrival of a flood wave is 15 minutes from the time of dam failure, affecting a population of about 4,900.

The State of California supervises all non-federal dams in California through the Dam Safety Program under the jurisdiction of DSOD. Engineers and engineering geologists review and approve plans and specifications for the design of dams and oversee their construction. In addition, the dams are inspected twice a year and continually monitored for seepage and settling. The Milpitas Fire Department Office of Emergency Services (OES) and the SCVWD coordinate preparedness efforts to mitigate against, plan for, respond to, and recover from natural hazards, including the possibility of dam failure.

OPEN SPACE AND ENVIRONMENTAL CONSERVATION ELEMENT

4.~~9~~1 WATER QUALITY AND CONSERVATION

The City lies at the base of the Diablo Range extending from the foothills to an alluvial plain of the Santa Clara Valley. The City is divided nearly in half between the eastern hillside area and the western low-lying plain. However, the hillside area is primarily undeveloped and designated as open space. Elevations range from sea level near Coyote Creek to approximately 2,400 feet above mean sea level (msl) near Monument Peak in the northeastern portion of the City.

Several intermittent streams/creeks flow out of the foothills and through Milpitas before eventually discharging into Coyote Creek, which is a perennial stream that borders the City of Milpitas to the west. Coyote Creek eventually becomes a tidal slough and discharges into San Francisco Bay. Figure ~~XX~~ Y-4-7 identifies the rivers, creeks, and streams that flow through the City of Milpitas.

The City of Milpitas is located in the Santa Clara Valley groundwater subbasin. The eastern hillside area of Milpitas contributes to groundwater recharge and much of this area is dedicated to open space. Given that the majority of soil in the western low-lying plains is either clay or clayey loam with very low infiltration rates, there is limited potential for groundwater recharge in this area. Some infiltration occurs in the stream beds of the streams and creeks that flow through the City where these creeks have not been channelized.